

Claims:

1. An areal metal element having a surface (13) which extends from a first outside edge (8) to a second outside edge (9) lying opposite the first outside edge (8), with the region of the metal element adjoining the first outside edge (8) forming a first side region (26) and the region of the metal element adjoining the second outer edge (9) forming a second side region (27), both said side regions being connected to one another by a central region (28) lying between them, and with at least one completely bordered aperture (22, 23) being formed in at least one of the side regions (26, 27), with its border being formed in one part by said side region (26, 27) and in the other part by the central region (28), with the central region (28) including at least two sections (29, 30) which each consist of two outwardly disposed part sections (31, 33, 34, 36) and a central part section (32, 35) lying between them, with the outwardly disposed part sections (31, 33, 34, 36) being folded over with respect to the central part section (32, 35) for the production of the aperture (22, 23); with the sections (29, 30) forming part of the border of the aperture (22, 23); and with the central region (28), including the sections (29, 30), being made in one piece with the two side regions (26, 27) of the metal element, characterized in that, in the central region (28), at least one further section (29, 30) is formed for each section (29; 30) and is associated with and of the same type as this section (29; 30), with the sections (29, 29; 30, 30) associated with one another being arranged sequentially in a direction from the first side region (26) to the second side region (27) and with each of the two outwardly disposed part sections (31, 33, 34, 36) of one of these sections (29, 30) being directly connected to the respective corresponding outwardly disposed part

section (31, 33; 34, 36) of the other section (29, 30) by an areal region (24, 25) of the metal element.

2. An areal metal element having a surface (13) which extends from a first outside edge (8) to a second outside edge (9) lying opposite the first outside edge (8), with the region of the metal element adjoining the first outside edge (8) forming a first side region (26) and the region of the metal element adjoining the second outer edge (9) forming a second side region (27), both said side regions being connected to one another by a central region (28) lying between them, and with at least one completely bordered aperture (22, 23) being formed in at least one of the side regions (26, 27), with its border being formed in one part by said side region (26, 27) and in the other part by the central region (28), with the central region (28) including at least two sections (29, 30) which each consist of two outwardly disposed part sections (31, 33, 34, 36) and a central part section (32, 35) lying between them, with the outwardly disposed part sections (31, 33, 34, 36) being folded over with respect to the central part section (32, 35) for the production of the aperture (22, 23); with the sections (29, 30) forming part of the border of the aperture (22, 23); and with the central region (28), including the sections (29, 30), being made in one piece with the two side regions (26, 27) of the metal element, characterized in that two folding edges (16, 17; 18, 19) are provided which are formed by the folding over of the outwardly disposed sections (31, 33, 34, 36) with respect to the central part section (32, 35) and of which the folding edge (17; 19) disposed more closely to the first outer edge (8) of the metal element points in the direction of the first outer edge (8) and the folding edge (16; 18) disposed more closely to the second outer edge (9) of the metal element points in

the opposite way thereto in the direction of the second outer edge (9).

3. A metal element in accordance with claim 1 or claim 2, characterized in that at least some of the outwardly disposed part sections (31, 33, 34, 36) are folded over in opposite senses to one another, i.e. in directions opposite to one another.
4. A metal element in accordance with claim 3, characterized in that one of the outwardly disposed part sections (31, 34) is folded over toward the upper side of the central part section (32, 35) and the other outwardly disposed part section (33, 36) is folded over toward the lower side of the central part section (32, 35).
- 15 5. A metal element in accordance with any one of the preceding claims, characterized in that at least some of the outwardly disposed part sections are folded over in the same sense with respect to one another, i.e. extending in the same direction.
- 20 6. A metal element in accordance with claim 5, characterized in that both outwardly disposed part sections are folded over toward the same side, i.e. either both toward the upper side or both toward the lower side of the central part section.
- 25 7. A metal element in accordance with any one of the preceding claims, characterized in that a plurality of apertures (22, 23) are formed at least in one of the side regions (26, 27).

8. A metal element in accordance with claim 7, characterized in that a plurality of apertures (22, 23) are formed in each of the side regions (26, 27).
- 5 9. A metal element in accordance with any one of the preceding claims, characterized in that additional apertures are formed in the central region (28).
10. A metal element in accordance with claim 9, characterized in that the apertures formed in the central region (28) are formed in correspondence with the apertures (22, 23) formed in the side regions (26, 27).
- 15 11. A metal element in accordance with any one of the preceding claims, characterized in that a section (29, 30) is formed as a web (10, 10', 10'', 11, 11', 11'') with side edges extending parallel to one another.
- 20 12. A metal element in accordance with any one of the preceding claims, characterized in that the side edges of different webs (10, 10', 10'', 11, 11', 11'') extend parallel to one another or obliquely to one another.
- 25 13. A metal element in accordance with any one of the preceding claims, characterized in that the spacing (12, 12') between the first and the second outside edges (8, 9) with folded over part sections (31, 33; 34, 36) is substantially larger than with non-folded over part sections (31, 33; 34, 36).
- 30 14. A metal element in accordance with claim 13, characterized in that the spacing (12') with folded over part sections (31, 33, 34, 36) is

approximately between 1.3 and 4 times as large, in particular approximately between 2 and 3 times as large, as the spacing (12) with non-folded over part sections (31, 33, 34, 36).

- 5      15. A metal element in accordance with any one of the preceding claims, characterized in that the apertures (22, 23) repeat at regular intervals.
- 10     16. A metal element in accordance with any one of the preceding claims, characterized in that the material of the metal element is substantially unexpanded, i.e. no stretching of the material takes place for the production of the aperture.
- 15     17. A metal element in accordance with any one of the preceding claims, characterized in that the side regions (26, 27) have a substantially planar surface (13) with the exception of the apertures (22, 23).
- 20     18. A metal element in accordance with any one of the preceding claims, characterized in that the surface (13) of the metal element is substantially planar with the exception of the apertures (22, 23).
- 25     19. A metal element in accordance with any one of the preceding claims, characterized in that the folded over, outwardly disposed part sections (31, 33; 34, 36) each include an angle with the central part section (32, 35) of approximately 110° to 0°, preferably from approximately 90° to 0°, advantageously from approximately 45° to 0°, in particular from approximately 10° to 0°.
- 30     20. A metal element in accordance with any one of the preceding claims, characterized in that each of the folded over, outwardly disposed

part sections (31, 33, 34, 36), which is directly connected to a side region (26, 27), merges continuously, in particular in a planar manner, into the side region (26, 27) connected to it.

5 21. A metal element in accordance with any one of the preceding claims, characterized in that a further metal section (53, 54) respectively adjoins the first and/or the second outside edge (8, 9) and forms an angular section (51, 52) together with the material extending between the first and the second outside edges (8, 9).

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22. A metal element in accordance with claim 21, characterized in that the angular section (51, 52) is L-shaped, V-shaped, U-shaped, C-shaped, T-shaped, I-shaped or Z-shaped.

15 23. A metal element in accordance with one of claims 21 or 22, characterized in that the further metal section (53, 54) or the further metal sections is/are formed in one piece with the remaining part of the metal element.

20 24. A metal element in accordance with any one of the preceding claims, characterized in that in addition to the first and second side regions (26, 27), a third and a fourth side region are present which lie opposite one another and respectively extend transversely, in particular perpendicularly, to the first and second side regions (26, 27); and in that the design of the surface (13) in a direction from the third side region to the fourth side region substantially corresponds to the design of the surface (13) in a direction from the first side region to the second side region (26, 27).

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25. A metal element in accordance with any one of the preceding claims, characterized in that to increase the bending stiffness over the length of the metal element, sequential sections (29, 30) are not only arranged along a straight line, in particular in the longitudinal direction of the metal element, but in that at least some sections (29, 30) are arranged laterally offset to one another.
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26. Use of a metal element in accordance with any one of the preceding claims as a section element (51, 52), in particular as a corner section or as a holder section, as a protective grid, as a fence section, as a filter mat, as a soundproofing element, as a plant climbing frame, as a step element, as a reinforcement mat, as an insert in composite materials, as a cable duct, as an aperture band, as a fitting element or as a decorative section
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27. A method of manufacturing a metal element having the features of any one of the preceding claims, wherein a material web (1) is provided with cuts (2, 3, 37, 38) in accordance with a pre-determined cut pattern for the production of the sections (29, 30) and the respective outwardly disposed part sections (31, 33, 34, 36) are folded over with respect to the central part section (32, 35) for the production of an aperture (22, 23), characterized in that, for the folding over of the outwardly disposed part sections (31, 33, 34, 36) with respect to the central part section (32, 35), the side regions (26, 27) of the metal element are moved apart from one another in opposite directions in a pivot movement until they lie substantially in the same plane after a complete pivoting.
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28. A method of manufacturing a metal element having the features of any one of the preceding claims, wherein a material web (1) is provided with cuts (2, 3, 37, 38) in accordance with a pre-determined cut pattern for the production of the sections (29, 30) and the respective outwardly disposed part sections (31, 33, 34, 36) are folded over with respect to the central part section (32, 35) for the production of an aperture (22, 23), in particular a method in accordance with claim 27,

5 characterized in that the cuts (2, 3, 37, 38) in the material web (1) are produced by a rotary cutting method or a laser cutting method.

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29. A method in accordance with claim 27 or claim 28, characterized in that the metal element is guided through a roll apparatus after the folding over of the metal element.

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30. A method in accordance with claim 29, characterized in that a strain hardening of the material web takes place, in particular in the central region (38), by the roll apparatus.